

REMARKS/ARGUMENTS

Reconsideration of this application in light of the foregoing amendments and following comments is courteously solicited.

Page 1 of the instant specification has been amended so as to include the heading "CROSS REFERENCE TO RELATED APPLICATION" and the reference that the instant application is a continuation-in-part of application Serial No. 09/337,452. In addition to the foregoing, it should be noted that Applicants have filed with the instant C-I-P application a claim for benefit of the earlier U.S. application under 35 U.S.C. 120. Accordingly, it is submitted that Applicants have complied with all of the conditions for receiving the benefit of the earlier filing date of application Serial No. 09/337,452 filed June 21, 1999 under 35 U.S.C. 120.

In response to the examiner's drawing objections raised in paragraph Nos. 4, 5 and 6 of the last office action, Applicants submit herewith for the examiner's approval proposed drawing corrections for drawing sheet Nos. 1/16, 2/16 and 11/16. The drawing changes as proposed in the attached sheets references Figures 2 and 3 as Prior Art and more clearly identifies the 2D electron gas curve and the energy band curve of Figures 11a and

11b. Applicants respectfully request the examiner to approve the attached drawing corrections.

Applicants have deleted the Abstract as originally filed and has submitted a new Abstract which complies with MPEP Section 608.01(b).

With regard to the line reference "25" on Page 1 of the instant specification, the reference has been deleted after the formula and inserted in the correct location.

In light of the foregoing, the examiner's objections to the specification raised in paragraphs 7-10 of his office action have now been rendered moot.

The examiner has raised a number of objections to claim 3 as set forth in paragraph 11 of his office action. Applicants by the instant amendment has attended to each of those objections thereby rendering same moot.

The examiner rejected claims 11, 12, 15 and 17 under 35 U.S.C. 112, second paragraph as being indefinite. Claims 11, 12, 15 and 17 have now been amended so as to overcome the "insufficient antecedent basis" indefiniteness of the claims.

Claims 1-3, 5-10, 13 and 16 have been rejected under 35 U.S.C. 103 as being unpatentable over Iafrare et al. in view of Esaki et al. Claim 4 has been rejected over the same two references as applied above in further view of Bethea et al.

Claims 11, 12, 14, 15, 17 and 18 have been rejected under 35 U.S.C. 103 over Iafrare et al. in view of Esaki et al. and Schiebel et al. Finally, claim 19 has been rejected under 35 U.S.C. 103 over Iafrare et al., in view of Esaki et al. and Chapple-Sokol et al. As to how these rejections apply to the claims as amended herein, they are respectfully traversed.

Independent claims 1, 3 and 19 have been amended so as to define over the cited prior art references.

The invention claimed in claims 1, 3 and 19 of the present invention uses the interband transition of the quantum band, and the electrons from the quantum band in neutral condition locate near the channel, then the 2DEG density of the channel increases by the quantum dot in positive condition, which is not electronically in neutral condition. The present invention uses such an effect, and therefore, is characterized by the near distance of the quantum dot layer and the channels unlike Iafrare's and Esaki's inventions, which do not teach or suggest the above-described character of the present invention.

Iafrare's is totally different from the present invention in its fundamental theory and structure. Iafrare et al. is drawn to dual channel HEMT, and the elements shown in Iafrare's can be used as electric elements and photo detectors. Iafrare et al. discloses the steps that electrons excited in the light

which occurs through transition between the valance band and the conduction band locate near the channel by light and then the electrons are detected by using two electrodes. Therefore, Iafrare et al. which uses the transition between the valance band and the conduction band is absolutely different from the present invention which uses the interband transition of the quantum dot.

Esaki et al. discloses the photo detector using the interband transition through the quantum well. Generally the electric elements using interband transition is well known, and Esaki's patent is about the photo detector according to a vertical transport form, which is completely different from the photo detector of a horizontal transport form in its structure. Esaki et al. discloses the step of detecting two electrons from the quantum structure by using two electrodes. However, the present invention comprises the step of detecting the change of 2DEG density by using two electrodes according to the change of the electrons from the quantum dot and the quantity of electric charge within the quantum dot. Esaki et al. fails to disclose the step of detecting the change of the quantity of electric charge in quantum structure.

In summary, a method which detects the change of the quantity of electric charge in an absorption layer as now

claimed in independent claims 1, 3 and 19 is not at all taught, suggested or rendered obvious by either the Iafrare et al. or the Esaki et al. patents.

The three tertiary references cited by the examiner fail to overcome the deficiencies noted above with regard to the Iafrare et al. and Esaki et al. references. Accordingly, it is believed that all of the claims as pending patentably define over the art of record and an early indication of same is respectfully requested.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it
is respectfully requested that they be charged to Deposit
Account No. 02-0184.

Respectfully submitted,

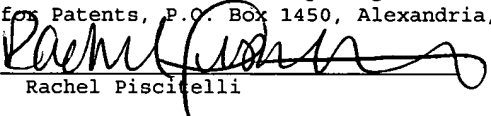
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I hereby certify that this correspondence is being deposited with the United States Postal
Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner
for Patents, P.O. Box 1450, Alexandria, VA 22313" on June 11, 2004.


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